

**AMENDMENT TO THE CLAIMS**

Claims 1-26 (canceled)

Claim 27. (currently amended) A method for ~~storing~~ manipulating data read from a primary memory ~~device in~~ and storing said data in a secondary memory ~~device, said secondary memory being a main memory of a processor and being provided~~ for read/write access by a processing means the processor, the data in the primary memory ~~device~~ being organized as a plurality of data ~~blocks~~ pages each consisting of one or more data objects ~~and the data objects being stored at one or more data regions of the secondary memory device~~, the secondary memory ~~device~~ comprising a plurality of at least three data storage sections, each data storage section having arranged in one or more data regions for storage of at least one of said data objects, the method comprising the steps of:

- 1) determining for each data object an access frequency indicating a number of accesses in a unit time interval; and
- 2) storing data objects whose access frequency falls in a predetermined access frequency range in ~~data regions belonging to a same~~ a corresponding data storage section and data region thereof; wherein
  - a) the access frequencies of an access frequency range of an (i+1)-th data storage section are greater than the access frequencies of an access frequency range of an i-th data storage section; and
  - b) each access frequency range comprises an upper and a lower access frequency threshold value, wherein

- i) a data object of the i-th data storage section is moved from the i-th to the (i+1)-th data storage section when the access frequency of said data object is greater than an upper access frequency threshold value of said i-th data storage section; or
- ii) a data object of the (i+1)-th data storage section is moved from the (i+1)-th to the i-th data storage section when the access frequency of said data object is smaller than a lower access frequency threshold value of said (i+1)-th data storage section.

Claim 28. (previously presented) The method of claim 27, wherein said access frequency is stored together with said data object in said data region.

Claim 29. (currently amended) The method of claim 27, wherein said upper access frequency threshold value of the i-th data storage ~~region~~ section is identical to said lower access frequency threshold value of the (i+1)-th data storage ~~region~~ section.

Claim 30. (currently amended) The method of claim 27, wherein said upper access frequency threshold value of the i-th data storage ~~region~~ section is larger than said lower access frequency threshold value of the (i+1)-th data storage ~~region~~ section such that a hysteresis is used when moving said data objects between said i-th and said (i+1)-th data storage section.

Claim 31. (previously presented) The method of claim 27, wherein  
the determined access frequency indicates the number of read accesses, write accesses or  
read and write accesses to a data object.

Claim 32. (previously presented) The method of claim 27, wherein  
a physical reference is updated when said data object is moved from one data storage  
section to another data storage section.

Claim 33. (previously presented) The method of claim 32, wherein  
said physical reference is updated in an index structure.

Claim 34. (currently amended) The method of claim 32, wherein  
each data object comprises a first resident part containing one or more attributes and a  
second movable file content part, and wherein a physical reference contained in one of the  
attributes is updated when said file content of said data object is moved.

Claim 35. (currently amended) The method of claim 34, wherein  
said first resident part is located on said primary memory ~~device~~ and said second movable  
file content part is located in said secondary memory ~~device~~.

Claim 36. (currently amended) A data ~~processing device~~ processor for processing data  
stored on ~~[[a]]~~ an external primary memory ~~device~~, the data in said primary memory ~~device~~

being organized as a plurality of data ~~blocks~~ pages each consisting of one or more data objects, said ~~processing device~~ data processor comprising:

[[a]] an internal secondary memory device adapted to store the data objects at one or more data regions being a main memory of the processor, said secondary memory ~~device~~ comprising a plurality of at least three data storage sections, each data storage section having arranged in one or more data regions for storage of data objects; and

a ~~processing~~ means for processing data, comprising:

- (a) a read/write ~~means~~ unit adapted to read and write data objects from and to one of said data storage sections ~~regions~~ of said secondary memory ~~device~~; and
- (b) an access frequency determining ~~means~~ unit adapted to determine for each data object stored in ~~one or more data regions~~ said data storage sections of said secondary memory ~~device~~ an access frequency indicating the number of accesses performed by said read/write ~~means~~ unit in a unit time interval; wherein
  1. said read/write ~~means~~ unit is adapted for writing data objects whose determined access frequency falls in a predetermined access frequency range in [[the]] one or more data regions belonging to ~~the same a~~ corresponding data storage section, and to update data objects according to their access frequency, wherein
  2. the access frequencies of an access frequency range of an (i+1)-th data storage section are greater than the access frequencies of an i-th data storage section; and

3. each access frequency range is assigned an upper and a lower access frequency threshold value, wherein
  - a. said read/write ~~means~~ unit is adapted to move a data object of the i-th data storage section from the i-th to the (i+1)-th data storage section when the access frequency of said data object is greater than ~~said upper access frequency threshold value~~ the upper access frequency threshold value of said i-th data storage section; and
  - b. said read/write ~~means~~ unit is adapted to move a data object of the (i+1)-th data storage section from the (i+1)-th to the i-th data storage section when the access frequency of said data object is smaller than ~~said lower access frequency threshold value~~ the lower access frequency threshold value of said (i+1)-th data storage section.

Claim 37. (currently amended) The data ~~processing device~~ processor of claim 36,  
wherein

in each data storage section each data region has assigned to it a predetermined access frequency of said access frequency range, and wherein said read/write ~~means~~ unit is adapted to move data objects within said data storage ~~region~~ section to other data ~~sections~~ regions of the same data storage ~~region~~ section in accordance with said determined access frequency.

Claim 38. (currently amended) The data ~~processing device~~ processor of claim 37,  
wherein

the determined access frequency indicates the number of read accesses, write accesses or  
read and write accesses to a data object.

Claim 39. (canceled)

Claim 40. (currently amended) The data ~~processing device~~ processor of claim 36,  
wherein

said read/write ~~means~~ unit is adapted to store said access frequency together with said  
data object in said data region.

Claim 41. (currently amended) The data ~~processing device~~ processor of claim 36,  
wherein

said primary memory ~~device~~ is a disk memory;

said data stored on said disk memory is data of a database;

~~said data blocks are pages of said database;~~

said data objects each comprise a plurality of data bytes;

~~said secondary memory is a main memory of a data processor;~~

~~said first~~ a first memory of said main memory is a page cache memory; and

~~said second~~ a second memory of said main memory is a resident data work memory.

Claim 42. (currently amended) The data ~~processing device~~ processor of claim 41,  
wherein

one part of the data of a single record of said database is stored in said page cache  
memory and another part of the data is stored in said resident data work memory.

Claim 43. (currently amended) The data ~~processing device~~ processor of claim 36,  
wherein

said upper access frequency threshold value of the i-th data storage ~~region~~ section is  
identical to said lower access frequency threshold value of the (i+1)-th data storage ~~region~~  
section.

Claim 44. (currently amended) The data ~~processing device~~ processor of claim 36,  
wherein

said upper access frequency threshold value of the i-th data storage ~~region~~ section is  
larger than said lower access frequency threshold value of the (i+1)-th data storage ~~region~~ section  
such that a hysteresis is used when moving said data objects between said i-th and said (i+1)-th  
data storage section.

Claim 45. (currently amended) A database system, comprising:  
a primary memory ~~device~~ on which data of the database system is stored; and  
a data ~~processing device~~ processor for processing data stored on the primary memory  
~~device~~, the data in said primary memory ~~device~~ being organized as a plurality of data blocks  
each consisting of one or more data objects, said ~~processing device~~ data processor comprising:

~~a secondary memory device adapted to store the data objects at one or more data regions, said secondary memory device comprising a plurality of data storage sections arranged in one or more data regions; and~~

~~a processing means comprising:~~

a secondary memory being a main memory of the data processor, said secondary memory comprising a plurality of three or more data storage sections, each said data storage section having one or more data regions adapted to store at least one data object therein;

a read/write ~~means~~ unit adapted to read and write data objects from and to the one or more data regions of said secondary memory ~~device~~; and

an access frequency determining ~~means~~ unit adapted to determine for each data object stored in one or more data regions of said secondary memory ~~device~~ an access frequency indicating the number of accesses performed by said read/write ~~means~~ unit in a unit time interval; wherein

1. said read/write ~~means~~ unit is adapted for writing data objects whose determined access frequency falls in a predetermined access frequency range in the one or more data regions belonging to the same data storage section, and to update data objects according to their access frequency, wherein
2. the access frequencies of an access frequency range of an (i+1)-th data storage section are greater than the access frequencies of an i-th data storage section; and



3. each access frequency range is assigned an upper and a lower access frequency threshold value, wherein
  - a. said read/write ~~means~~ unit is adapted to move a data object of the i-th data storage section from the i-th to the (i+1)-th data storage section when the access frequency of said data object is greater than ~~said upper access frequency threshold value~~ the upper access frequency threshold value of said i-th data storage section; and
  - b. said read/write ~~means~~ unit is adapted to move a data object of the (i+1)-th data storage section from the (i+1)-th to the i-th data storage section when the access frequency of said data object is smaller than ~~said lower access frequency threshold value~~ the lower access frequency threshold value of said (i+1)-th data storage section.

Claim 46. (currently amended) The database system of claim 45, wherein in each data storage section each data region has assigned to it a predetermined access frequency of said access frequency range, and wherein said read/write ~~means~~ unit is adapted to move data objects within said data storage ~~region~~ section to other data ~~sections~~ regions of the same data storage ~~region~~ section in accordance with said determined access frequency.

Claim 47. (previously presented) The database system of claim 46, wherein the determined access frequency indicates the number of read accesses, write accesses or read and write accesses to a data object.

Claim 48. (canceled)

Claim 49. (currently amended) The database system of claim 45, wherein  
said read/write ~~means~~ unit is adapted to store said access frequency together with said  
data object in said data region.

Claim 50. (currently amended) The database system of claim 49, wherein  
one part of the data of a single record of said database is stored in ~~said~~ a page cache  
memory and another part of the data is stored in ~~said~~ a resident data work memory.

Claim 51. (currently amended) The database system of claim 45, wherein  
said upper access frequency threshold value of the i-th data storage ~~region~~ section is  
identical to said lower access frequency threshold value of the (i+1)-th data storage ~~region~~  
section.

Claim 52. (currently amended) The database system of claim 45, wherein  
said upper access frequency threshold value of the i-th data storage ~~region~~ section is  
larger than said lower access frequency threshold value of the (i+1)-th data storage ~~region~~ section  
such that a hysteresis is used when moving said data objects between said i-th and said (i+1)-th  
data storage section.